IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	:	Art Unit: 2622
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Björkman et al.	:	Attorney Docket No.: 69993-236346
	:	
Application No.: 10/594,452	:	Art Unit: 3715
	:	
Filed: September 26, 2006	:	Examiner: A. Carlos

Title: SYSTEM AND METHOD FOR WEAPON EFFECT SIMULATION

BRIEF ON APPEAL

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Sir:

This brief is submitted pursuant to the notice of appeal filed June 21, 2010.

Real Party In Interest

The real party in interest in this appeal is the assignee, SAAB AB, SE-581 88 Linköping, Sweden, by virtue of an assignment from the inventors to SAAB AB, which was recorded in the U.S. Patent and Trademark Office on August 12, 2010, at reel 024824, frame 0119.

Related Appeals and Interferences

Applicants are unaware of any related appeals or interferences which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

Status of Claims

The application as filed included claims 1-27, which Applicants amended in a preliminary amendment submitted September 26, 2006, with the application. In a response submitted July 11, 2008, to the office action issued April 22, 2008, Applicants amended claims 1 and 27. In a response accompanying a request for continued examination submitted June 4, 2009, to the final office action issued March 4, 2009, Applicants amended claims 1-3, 5, 8, 9, 11-16, 18, 19, 22, and 24-27. In the response submitted September 23, 2009, to the office action issued June 23, 2009, Applicants amended claims 1, 4, 6, 7, 9, 11, 17, 22, and 24-27. In response to the final office action issued January 21, 2010, Applicants submitted a notice of appeal on June 21, 2010. Applicants have not submitted any amendments subsequent to the final office action.

Status of Amendments

Applicants have not submitted any amendments subsequent to the final office action.

Summary of Claimed Subject Matter

The invention recited in independent claim 1 includes a weapon effect simulation system (page 1, lines 4-5). The system includes a weapon 1 including a fire simulation system including a transmitter 2 configured to transmit electromagnetic waves 7' and 7" from a weapon 4 to simulate real ammunition from the weapon. (*See* page 12, lines 22-34; and Figs. 1 and 2.) The transmitter includes information in the electromagnetic waves. (*See* page 9, lines 2-7; and Figs. 1 and 2.) The system further includes a calculating unit 17 configured to calculate an imagined trajectory of the simulated ammunition and a processor configured to determine a geographical position of the weapon. (*See* the abstract, page 13, lines 25, through page 14, line 16; and Figs. 2 and 5.) The transmitter 2 is operative to include in the electromagnetic waves 7' and 7" information related to coordinates in the three-dimensional space for the calculated ammunition trajectory. (See page 6, line 29, through page 7, line 23; and Figs. 2 and 5.) At least one target 9 includes a hit simulation system including a receiver 34 configured to receive the transmitted electromagnetic waves from the weapon and a processor configured to determine whether a target has been hit based on the information related to coordinates in the three-dimensional space for the calculated ammunition trajectory in the received electromagnetic waves. (*See* page 3, lines 3-4 and 8-10; page 7, lines 1-23; page 8, lines 30-35; page 9, lines 2-12; and Fig. 4.)

According to claim 2, which depends from claim 1, the transmitter 2 may be a laser transmitter operative to transmit laser radiation with at least one beam lobe 7, and 7". (See page 12, line 13, through page 13, line10; and Fig. 1.)

As recited in claim 3, which depends from claim 2, the transmitter 2 may further include a radio transmitter operative to transmit radio waves (page 6, line 29, through page 7, line 23; and Fig. 1).

Claim 4, which depends from claim 3, recites that the processor may be operative to determine target hits based primarily on the information in the laser radiation and secondarily on the information in the radio waves (page 6, line 29, through page 7, line 23).

As recited in claim 5, which depends from claim 1, the transmitter 2 may include a radio transmitter operative to transmit radio waves (page 6, line 29, through page 7, line 23; and Fig. 1).

According to claim 6, which depends from claim 1, the transmitter may be operative to continuously include, based on the calculated trajectory, information concerning the current trajectory position of the simulated ammunition (page 5, line 24, through page 6, line 2; and page 14, lines 32-35).

Claim 7, which depends from claim 1, recites that the processor may be operative to include, during a period of time that is shorter than the flight time of the real ammunition and

based on the calculated trajectory, information concerning the trajectory positions of the simulated ammunition (page 5, lines 4-11; and page 11, lines 32-35).

As recited in claim 8, which depends from claim 1, the calculating unit may be operative to determine an impact point or burst point of the ammunition, and wherein the information related to the calculated ammunition trajectory contains the impact point or burst point (page 15, lines 33-35; and page 17, lines 18-33).

According to claim 9, which depends from claim 1, the fire simulation system may include a transmitter operative to transmit information regarding the geographical position of the weapon, and the at least one target includes a hit simulation comprising a receiver operative to receive the position data (page 8, lines 30-35; and page 10, line 15, through page 11, line 25).

Claim 10, which depends from claim 9, recites that the information related to the calculated ammunition trajectory may be determined relative to the geographical position of the weapon (page 8, lines 30-35).

As recited in claim 11, which depends from claim 1, the hit simulation system may include a processor configured to determine the geographical position of the target (page 11, lines 17-25).

According to claim 12, which depends from claim 11, at least one of the targets may include a hit simulation system including a transmitter 26, and the fire simulation system may

include a receiver 14 operative to receive information from the transmitter of the hit simulation system (page 17, line 35, through page 18, line 17; and Figs. 4-6).

Claim 13, which depends from claim 12, recites that the transmitter 26 of the hit simulation system, may be operative to transmit information regarding the geographical position of the target (page 18, lines 18-28; and Figs. 4-6).

As recited in claim 14, which depends from claim 13, the calculating unit may be operative to determine which target has been hit, and the information related to the calculated ammunition trajectory may include information that identifies the determined target (page 14, line 32, through page 15, line 31).

According to claim 15, which depends from claim 12, the transmitter 26 of the hit simulation system is operative to transmit a hit message upon determination of a hit (page 17, line 35, through page 18, line 2).

Claim 16, which depends from claim 15, recites that a receiver for a hit simulation system that has not determined a hit may act as a secondary object and may be operative to receive the transmitted hit message (page 16, line 35, through page 17, line 16).

As recited in claim 17, which depends from claim 16, the processor may be operative to decide upon receiving hit messages whether the secondary object has been hit (page 16, line 35, through page 17, line 16).

According to claim 18, which depends from claim 15, the transmitter may be operatively connected with the receiver of the fire simulation system and is operative to break off the simulation upon receiving the hit message (page 17, line 35, through page 18, line 17).

Claim 19, which depends from claim 15, recites that the fire simulation system may include a display configured to display hit locations and effects based on received hit messages (page 17, line 35, through page 18, line 17).

As recited in claim 20, which depends from claim 19, the display may be operative to display hit locations and effects visually (page 17, line 35, through page 18, line 17).

According to claim 21, which depends from claim 1, the fire simulation system may be disposed at a weapon (page 7, lines 25-35; page 12, lines 22-31; and Fig. 1).

Claim 22, which depends from claim 1, recites that the processor may include a geographical position that is separate from the geographical position of the transmitter (page 11, lines 7-25).

As recited in claim 23, which depends from claim 1, the at least one hit simulation system 28 may be disposed in connection with a respective target (page 15, lines 33-35; and Fig. 4).

According to claim 24, which depends from claim 1, the processor may be operative to

determine a hit location on the target (page 6, line 29, through page 7, line 23; page 9, lines 2-12).

Claim 25, which depends from claim 1, recites that the processor may be operatively connected with the transmitter of the fire simulation system and operative to break off the simulation if a hit is determined corresponding to damage or injury that renders continued firing impossible (page 17, line 35, through page 18, line 17).

The invention recited in independent claim 26 relates to a fire simulation system for weapon effect simulation systems (page 1, lines 4-5). The system includes a transmitter 2 arranged with the weapon 1 and configured to transmit electromagnetic waves 7' and 7" for simulating ammunition from a weapon and for including information in the electromagnetic waves operative to include information related to coordinates in the three-dimensional space for the calculated ammunition trajectory. (*See* page 6, line 29, through page 7, line 23; page 9, lines 2-7; page 12, lines 22-34; and Figs. 1, 2 and 5.) A calculating unit 17 is arranged with the weapon and configured to calculate the imagined trajectory of the ammunition. (*See* the abstract, page 13, lines 25, through page 14, line 16; and Figs. 2 and 5) A processor is arranged with the weapon and configured to determine the geographical position of the weapon. (*See* the abstract, page 13, lines 25, through page 14, line 16; and Figs. 2 and 5.)

The invention recited in independent claim 27 includes a method for simulating an effect of a weapon on one or more potential targets (page 9, lines 2-3). The method includes calculating with the weapon the imagined trajectory of the simulated ammunition (page 9, lines

7-8). Electromagnetic waves for simulating ammunition from the weapon are modulated with information (page 9, 10-11). The information includes information related to coordinates in the three-dimensional space for the calculated ammunition trajectory (page 9, 10-11). The modulated electromagnetic waves are transmitted from the weapon for reception by the potential targets (page 9, lines 3-5). A determination is made with the targets upon reception of the electromagnetic waves for each respective target as to whether the target has been hit, based on the information related to coordinates in the three-dimensional space for the calculated ammunition trajectory in the received electromagnetic waves (page 9, lines 6-12).

Advantages of the claimed invention include permitting realistic simulation of ammunition that is guided by a gunner, observer or forward observer, where the trajectory of the ammunition can be corrected after firing. For example, weapons with which a gunner can switch targets during flight of the ammunition by adjusting the trajectory, such as with a joystick, can be simulated in a realistic manner by using the claimed invention. The claimed invention also enables precision simulation of ammunition fired at both moving targets and standing targets without requiring reflectors. This results in a simpler and less expensive system. Additionally, different targets can selectively use received information. The claimed invention can be used for firing range or tactical training. Advantages of the claimed invention are discussed at page 2, line 31, through page 5, line 22.

Grounds Of Rejection To Be Reviewed On Appeal

I. The Examiner rejected claims 1-27 under 35 U.S.C. § 102(b) as being anticipated by U.S. patent 6,386,879 to Varshneya.

Argument

I. Claims 1-27 are patentable under 35 U.S.C. § 103(a) over U.S. patent 6,386,879 to Varshneya.

Varshneya does not disclose the present invention as recited in the claims since, among other things, Varshneya does not disclose a weapon simulation system that includes a weapon including a calculating unit configured to calculate an imagined trajectory of simulated ammunition, a processor configured to determine a geographical position of the weapon, and a transmitter operative to include in the electromagnetic waves information related to coordinates in the three-dimensional space for the calculated ammunition trajectory. Varshneya also does not suggest at least one target including a hit simulation system including a receiver configured to receive the transmitted electromagnetic waves from the weapon and a processor configured to determine whether a target has been hit based on the information related to coordinates in the three-dimensional space for the calculated ammunition trajectory in the received electromagnetic waves.

Rather, Varshneya suggests a target system that determines an impact point for the

ammunition, as described at, for example, col. 2, lines 16-19 and 11-14. As described at col. 4, lines 58-62, the impact point is determined by running a ballistic simulation of the ammunition trajectory, but still the calculation is performed at the target system, not the system of the weapon. The Examiner asserts that Varshneya at col. 2, lines 13-20, and Figs. 1A and 1B, suggest a fire simulation system that includes a calculating unit configured to calculate an imagined trajectory of the simulated ammunition. However, it is clear from the above that the calculating unit at the target makes these calculations. On the other hand, according to the claimed invention, the trajectory is transmitted from the weapon.

Additionally, Varshneya does not suggest including in electromagnetic waves information related to coordinates in three-dimensional space for a calculated ammunition trajectory. This follows from the fact that Varshneya does not suggest a weapon that calculates coordinates in three dimensional space for the calculated ammunition trajectory. The Examiner asserts that col. 4, lines 43-47, of Varshneya suggest including information in electromagnetic waves. However, Varshneya only suggests including in the electromagnetic waves position information related to the position of the shooter´s system, not to the trajectory of the simulated ammunition.

On the other hand, the claimed invention relates to a weapon effect simulation system, wherein a target can receive electromagnetic waves from a shooter and evaluate whether the target has been hit based on the ammunition trajectory information of the electromagnetic beam received from the shooter.

In view of the above, Varshneya does not disclose all elements of the invention recited in claims 1-27. Since Varshneya does not disclose all elements of the invention recited in claims 1-27, the invention recited in claims 1-27 is not properly rejected under 35 U.S.C. § 102(b). For an anticipation rejection under 35 U.S.C. § 102(b) no difference may exist between the claimed invention and the reference disclosure. *See Scripps Clinic and Research Foundation v. Genentech, Inc.*, 18 U.S.P.Q. 841 (C.A.F.C. 1984).

Along these lines, anticipation requires the disclosure, in a cited reference, of each and every recitation, as set forth in the claims. *See Hodosh v. Block Drug Co.*, 229 U.S.P.Q. 182 (Fed. Cir. 1986); *Titanium Metals Corp. v. Banner*, 227 U.S.P.Q. 773 (Fed. Cir. 1985); *Orthokinetics, Inc. v. Safety Travel Chairs*, Inc., 1 U.S.P.Q.2d 1081 (Fed. Cir. 1986); and *Akzo N.V. v. U.S. International Trade Commissioner*, 1 U.S.P.Q.2d 1081 (Fed. Cir. 1986).

Accordingly, U.S. patent 6,386,879 to Varshneya does not disclose the invention recited in claims 1-27. Therefore, U.S. patent 6,386,879 to Varshneya does not anticipate the invention recited in claims 1-27. Consequently, Applicants respectfully request reversal of this ground of rejection.

Conclusion

In view of the above, Varshneya does not disclose the claimed invention. As a result, Varshneya does not anticipate the claimed invention. Accordingly, Applicants submit that the claimed invention is patentable over Varshneya. Consequently, Applicants respectfully request

reversal of the rejections and issuance of the Notice of Allowance.

The undersigned authorizes the Commissioner to charge insufficient fees and credit overpayment associated with this communication to Deposit Account No. 22-0261.

Respectfully Submitted,

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/Eric J. Franklin/
Eric J. Franklin, Reg. No. 37,134
Attorney for Applicants
Venable LLP
575 Seventh Street, NW
Washington, DC 20004
Telephone: 202-344-4936
Facsimile: 202-344-8300

Appendix A

Claims On Appeal

1. A weapon effect simulation system, comprising:

a weapon comprising a fire simulation system comprising a transmitter configured to transmit electromagnetic waves from a weapon to simulate real ammunition from the weapon, and the transmitter including information in the electromagnetic waves, the fire simulation system further comprising a calculating unit configured to calculate an imagined trajectory of the simulated ammunition and a processor configured to determine a geographical position of the weapon, wherein the transmitter is operative to include in the electromagnetic waves information related to coordinates in the three-dimensional space for the calculated ammunition trajectory; and

at least one target comprising a hit simulation system comprising a receiver configured to receive the transmitted electromagnetic waves from the weapon and a processor configured to determine whether a target has been hit based on the information related to coordinates in the three-dimensional space for the calculated ammunition trajectory in the received electromagnetic waves.

2. The weapon effect simulation system according to claim 1, wherein the transmitter comprises a laser transmitter operative to transmit laser radiation with at least one beam lobe.

3. The weapon effect simulation system according to claim 2, wherein the transmitter

further comprises a radio transmitter operative to transmit radio waves.

4. The weapon effect simulation system according to claim 3, wherein the processor is operative to determine target hits based primarily on the information in the laser radiation and secondarily on the information in the radio waves.

5. The weapon effect simulation system according to claim 1, wherein the transmitter comprises a radio transmitter operative to transmit radio waves.

6. The weapon effect simulation system according to claim 1, wherein the transmitter is operative to continuously include, based on the calculated trajectory, information concerning the current trajectory position of the simulated ammunition.

7. The weapon effect simulation system according to claim 1, wherein the processor is operative to include, during a period of time that is shorter than the flight time of the real ammunition and based on the calculated trajectory, information concerning the trajectory positions of the simulated ammunition.

8. The weapon effect simulation system according to claim 1, wherein the calculating unit is operative to determine an impact point or burst point of the ammunition, and wherein the information related to the calculated ammunition trajectory contains the impact point or burst point.

9. The weapon effect simulation system according to claim 1, wherein the fire simulation system comprises a transmitter operative to transmit information regarding the geographical position of the weapon, and wherein at least one target comprises a hit simulation comprising a receiver operative to receive said position data.

10. The weapon effect simulation system according to claim 9, wherein the information related to the calculated ammunition trajectory is determined relative to the geographical position of the weapon.

11. The weapon effect simulation system according to claim 1, wherein said hit simulation system comprises a processor configured to determine the geographical position of the target.

12. The weapon effect simulation system according to claim 11, wherein at least one of the targets comprises a hit simulation system comprising a transmitter, and wherein the fire simulation system comprises a receiver operative to receive information from the transmitter of the hit simulation system.

13. The weapon effect simulation system according to claim 12, wherein the transmitter of the hit simulation system is operative to transmit information regarding the geographical position of the target.

14. The weapon effect simulation system according to claim 13, wherein the calculating

unit is operative to determine which target has been hit, and wherein the information related to the calculated ammunition trajectory includes information that identifies the determined target.

15. The weapon effect simulation system according to claim 12, wherein the transmitter of the hit simulation system is operative to transmit a hit message upon determination of a hit.

16. The weapon effect simulation system according to claim 15, wherein a receiver for a hit simulation system that has not determined a hit acts as a secondary object and is operative to receive the transmitted hit message.

17. The weapon effect simulation system according to claim 16, wherein the processor is operative to decide upon receiving hit messages whether the secondary object has been hit.

18. The weapon effect simulation system according to claim 15, wherein the transmitter is operatively connected with the receiver of the fire simulation system and is operative to break off the simulation upon receiving the hit message.

19. The weapon effect simulation system according to claim 15, wherein the fire simulation system comprises a display configured to display hit locations and effects based on received hit messages.

20. The weapon effect simulation system according to claim 19, wherein the display is operative to display hit locations and effects visually.

21. The weapon effect simulation system according to claim 1, wherein the fire simulation system is disposed at a weapon.

22. The weapon effect simulation system according to claim 1, wherein the processor has a geographical position that is separate from the geographical position of the transmitter.

23. The weapon effect simulation system according to claim 1, wherein said at least one hit simulation system is disposed in connection with a respective target.

24. The weapon effect simulation system according to claim 1, wherein the processor is operative to determine a hit location on the target.

25. The weapon effect simulation system according to claim 1, wherein the processor is operatively connected with the transmitter of the fire simulation system and operative to break off the simulation if a hit is determined corresponding to damage or injury that renders continued firing impossible.

26. A fire simulation system for weapon effect simulation systems, comprising:

a transmitter arranged with the weapon and configured to transmit electromagnetic waves for simulating ammunition from a weapon and for including information in the electromagnetic waves operative to include information related to coordinates in the three-dimensional space for the calculated ammunition trajectory;

a calculating unit arranged with the weapon and configured to calculate the imagined trajectory of the ammunition; and

a processor arranged with the weapon and configured to determine the geographical position of the weapon.

27. A method for simulating an effect of a weapon on one or more potential targets, the method comprising:

calculating with the weapon the imagined trajectory of the simulated ammunition,

modulating with information electromagnetic waves for simulating ammunition from the weapon, wherein the information includes information related to coordinates in the three-dimensional space for the calculated ammunition trajectory,

transmitting from the weapon the modulated electromagnetic waves for reception by the potential targets,

making a determination with the targets upon reception of the electromagnetic waves for each respective target as to whether the target has been hit, based on the information related to coordinates in the three-dimensional space for the calculated ammunition trajectory in the received electromagnetic waves.

Appendix B

Evidence Appendix

None

Appendix C

Related Proceedings Appendix

None